Claims

1. A process for performing Fischer-Tropsch synthesis using at least one compact catalytic reactor unit (10) defining channels (14, 14a) for the Fischer-Tropsch synthesis reaction in which there is a gas-permeable catalyst structure (16), characterized in that a carbon monoxide-containing gas undergoes Fischer-Tropsch synthesis in at least two successive stages, the gas flow velocity in the first stage being sufficiently high that no more than 70% of the carbon monoxide undergoes the synthesis reaction in the first stage, the gases being cooled (25) between the successive stages so as to condense water vapour, and the gas flow velocity in the second stage being sufficiently high that no more than 70% of the remaining carbon monoxide undergoes the synthesis reaction in the second stage.

2. A process as claimed in claim 1 performed using a single reactor unit (10), wherein each stage of the synthesis reaction takes place in a set of channels (14, 14a) within the reactor unit, and the gases are cooled (25) within a header (18) between successive stages.

3. A process as claimed in claim 1 or claim 2 wherein a carbon monoxide-containing gas stream flows through a plurality of first channels (14, 14a) in parallel in the first stage, and then through a plurality of second channels (14, 14a) in parallel in the second stage, the cross-sectional area of the plurality of second channels (14, 14a) being less than that of the plurality of first channels (14, 14a).

4. A process as claimed in claim 3 wherein the number of second channels (14, 14a) is less than the number of first channels (14, 14a).

5. A process as claimed in any one of the preceding claims wherein in both the first stage and the second stage the space velocity is above 1000 /hr.

6. A process as claimed in claim 5 wherein, in both the first stage and the second stage the space velocity is no greater than 15000 /hr.

7. A process as claimed in any one of the preceding claims wherein water vapour does not exceed 20 mole%.

8. A process as claimed in any one of the preceding claims wherein the gas flow velocity through both the first stage and the second stage is sufficiently high that no more than 65% of the carbon monoxide undergoes the synthesis reaction.

9. A process for performing Fischer-Tropsch synthesis on a gas containing hydrogen and carbon monoxide using at least one compact catalytic reactor unit (10) defining channels (14, 14a) for the Fischer-Tropsch synthesis in which there is a gas-permeable catalyst structure(16), wherein the synthesis is performed in at least two successive stages, at a sufficiently high gas flow velocity that water vapour does not exceed 20 mole%, and that between successive stages the gases are cooled (25) so as to condense water vapour.

10. Apparatus for performing a Fischer-Tropsch synthesis as claimed in any one of the preceding claims, comprising at least one compact catalytic reactor unit (10) defining channels (14, 14a) for the Fischer-Tropsch synthesis reaction in which there is a gas-permeable catalyst structure (16), connecting means (18) communicating between successive sets of channels (14, 14a), and cooling means (25) within the connecting means to

condense water vapour and to remove condensed liquids from the gas flow.

11. Apparatus as claimed in claim 10 wherein the successive sets of channels (14, 14a) are in the same reactor unit (10), and the connecting means (18) is a header.

12. Apparatus as claimed in claim 10 or claim 11 wherein the cross-sectional area of the flow channels (14, 14a) carrying flow out of the connecting means (18) is less than the cross-sectional area of the flow channels (14, 14a) carrying flow into the connecting means (18).

13. Apparatus as claimed in any one of claims 10 to 12 wherein the number of flow channels (14, 14a) carrying flow out of the connecting means (18) is less than the number of flow channels (14, 14a) carrying flow into the connecting means (18).

14. Apparatus as claimed in any one of claims 10 to 13 also comprising means (14b) to ensure the temperature in the synthesis channels (14, 14a) does not exceed 210°C.